10/662,163

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Set     Items   Description
S1        408   AU= (GARROWAY A? OR GARROWAY, A? OR SUITS B? OR SUITS, B?)
S2    1773372   MRI OR MAGNETIC(W)RESONANC? OR NMR OR FTNMR OR FTMRI OR MA-
             GNETORESONANCE  OR PMR OR PROTON(W)MAGNETIC(W)RESONAN? OR MR(
             )(IMAGE OR IMAGING) OR MRA OR MRS
S3       9768   IC=(G01R-003 OR G01N-024/08 OR G01V-003/175 OR G01V-003/00
            OR H01F-005/00)
S4       6217   MC=(S01-E02A2 OR S03-E07A OR S01-E02A8A OR S01-E02A1 OR S0-
            3-E07C OR S05-D02B1 OR S03-C02F1)
S5       6499   CC=(A87601 OR B7510N)
S6    1778870   S2:S5
S7     931296   MAGNETIC?(3N)FIELD?
S8       5341   GRADIOMETER? OR GRADIO()METER?
S9    2350756   TRANSMIT? OR RECEIVER? OR TRANSDUCER?
S10   1223098   PROBE? ?
S11   2025219   SWITCH?
S12    729344   COIL?
S13  13988907   DETECT? OR SENS?
S14         9   S8 AND S1
S15         4   RD (unique items)
S16        22   S8(3N)(S10 OR PROBING)
S17         0   S16 AND S6
S18         3   S8 AND (S10 OR PROBING) AND S6
S19         3   S18 NOT S16
S20         7   S16 AND SURFAC?
S21         7   S20 NOT S19
S22         7   S21 NOT S15
S23         5   RD (unique items)
S24      2070   S7 AND S8
S25       107   S7 AND S8 AND S13 AND (S9 OR S10 OR S11)
S26        21   S7 (10N) S8 (10N) S13 (10N) (S9 OR S10 OR S11)
S27        14   RD (unique items)
S28        12   S27 NOT (S19 OR S14 OR S23)
S29        18   S25 AND SURFACE?
S30        13   RD (unique items)
S31         9   S30 NOT (S28 OR S19 OR S14 OR S23)
? show files
File   2:INSPEC 1969-2004/Jul W2
         (c) 2004 Institution of Electrical Engineers
File 155:MEDLINE(R) 1966-2004/Jul W3
         (c) format only 2004 The Dialog Corp.
File   5:Biosis Previews(R) 1969-2004/Jul W2
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File  94:JICST-EPlus 1985-2004/Jun W4
         (c)2004 Japan Science and Tech Corp(JST)
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         (c) 2004 ProQuest Info&Learning
File 144:Pascal 1973-2004/Jul W2
         (c) 2004 INIST/CNRS
File 105:AESIS 1851-2001/Jul
         (c) 2001 Australian Mineral Foundation Inc
File  99:Wilson Appl. Sci & Tech Abs 1983-2004/Jun
         (c) 2004 The HW Wilson Co.
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(c) 2004 Geosystems
File 34:SciSearch(R) Cited Ref Sci 1990-2004/Jul W2
(c) 2004 Inst for Sci Info
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
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(c) 2000 SRI International
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(c) 2004 American Mathematical Society
File 347:JAPIO Nov 1976-2004/Mar(Updated 040708)
(c) 2004 JPO & JAPIO
File 305:Analytical Abstracts 1980-2004/Jul W1
(c) 2004 Royal Soc Chemistry
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200445
(c) 2004 Thomson Derwent
?

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SYSTEM:OS  - DIALOG OneSearch
  File   2:INSPEC 1969-2004/Sep W2
         (c) 2004 Institution of Electrical Engineers
*File   2: Alert feature enhanced for multiple files, duplicates
removal, customized scheduling. See HELP ALERT.
  File   6:NTIS 1964-2004/Sep W3
         (c) 2004 NTIS, Intl Cpyrght All Rights Res
  File   8:Ei Compendex(R) 1970-2004/Sep W2
         (c) 2004 Elsevier Eng.  Info. Inc.
  File  34:SciSearch(R) Cited Ref Sci 1990-2004/Sep W2
         (c) 2004 Inst for Sci Info
  File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
         (c) 1998 Inst for Sci Info
  File  35:Dissertation Abs Online 1861-2004/Aug
         (c) 2004 ProQuest Info&Learning
  File  65:Inside Conferences 1993-2004/Sep W3
         (c) 2004 BLDSC all rts. reserv.
  File  94:JICST-EPlus 1985-2004/Aug W4
         (c)2004 Japan Science and Tech Corp(JST)
  File  99:Wilson Appl. Sci & Tech Abs 1983-2004/Aug
         (c) 2004 The HW Wilson Co.
  File 144:Pascal 1973-2004/Sep W2
         (c) 2004 INIST/CNRS
  File 305:Analytical Abstracts 1980-2004/Sep W3
         (c) 2004 Royal Soc Chemistry
*File 305: Alert feature enhanced for multiple files, duplicate
removal, customized scheduling.  See HELP ALERT.
  File 315:ChemEng & Biotec Abs 1970-2004/Aug
         (c) 2004 DECHEMA
  File 350:Derwent WPIX 1963-2004/UD,UM &UP=200460
         (c) 2004  Thomson Derwent
*File 350: For more current information, include File 331 in your search.
Enter HELP NEWS 331 for details.
  File 347:JAPIO Nov 1976-2004/May(Updated 040903)
         (c) 2004 JPO & JAPIO
*File 347: JAPIO data problems with year 2000 records are now fixed.
Alerts have been run.  See HELP NEWS 347 for details.
  File 344:Chinese Patents Abs Aug 1985-2004/May
         (c) 2004 European Patent Office
  File 371:French Patents 1961-2002/BOPI 200209
         (c) 2002 INPI.  All rts. reserv.
*File 371: This file is not currently updating. The last update is 200209.
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Set	Items	Description
S1	87	AU=(SUITS, B? OR SUITS B)
S2	277	AU=(GARROWAY, A? OR GARROWAY A?)
S3	16	S1 AND S2
S4	10	S3 AND (MRI OR MAGNETIC(1W)(IMAG? OR IMAGING) OR MAGNETIC(-W)RESONAN? OR NMR OR NUCLEAR()MAGNETIC()RESONANCE OR FTNMR OR FTMRI OR MAGNETORESONANCE OR PMR OR PROTON(W)MAGNETIC(W)RESONAN? OR MR()(IMAGE? OR IMAGING))
S5	8	RD (unique items)
S6	6	S3 NOT S4
S7	5	RD (unique items)
S8	5	S7 AND ((NQR OR NUCLEAR()QUADRUPOL?()RESONANC?) OR (EPR OR ELECTRON()PARAMAGNETIC?()RESONANC?))

5/3,AB/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

7887412 INSPEC Abstract Number: A2004-08-7660G-002
Title: sup 14/N **magnetic resonance** for materials detection in the field
Author(s): **Suits, B.H.**; **Garroway, A.N.**; Miller, J.B.; Sauer, K.L.
Author Affiliation: Dept. of Phys., Michigan Molecular Inst., Houghton, MI, USA
Journal: Solid State Nuclear Magnetic Resonance vol.24, no.2-3 p. 123-36
Publisher: Academic Press,
Publication Date: Sept.-Nov. 2003 Country of Publication: USA
CODEN: SSNRE4 ISSN: 0926-2040
SICI: 0926-2040(200309/11)24:2/3L.123:MRMD;1-4
Material Identity Number: H809-2003-006
U.S. Copyright Clearance Center Code: 0926-2040/03/$30.00
Language: English
Abstract: Nitrogen is prevalent in many materials, both naturally occurring and man-made. In particular, it is found in many explosives and other contraband materials. One technique for the detection of such materials in the field is the use of the **magnetic resonance** signal from the nearly 100% abundant, spin-1, /sup 14/N nuclei. Some of the difficulties with such measurements in the field include spurious signals from acoustic resonances, radio-frequency interference, and generally low signal-to-noise ratios. A summary of recent work by the authors to help mitigate these difficulties is presented.
Subfile: A

5/3,AB/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

7585923 INSPEC Abstract Number: A2003-10-7660G-002
Title: Secondary echoes in three-frequency nuclear quadrupole resonance of spin-1 nuclei
Author(s): Sauer, K.L.; **Suits, B.H.**; **Garroway, A.N.**; Miller, J.B.
Author Affiliation: Naval Res. Lab., Washington, DC, USA
Journal: Journal of Chemical Physics vol.118, no.11 p.5071-81
Publisher: AIP,
Publication Date: 15 March 2003 Country of Publication: USA
CODEN: JCPSA6 ISSN: 0021-9606
SICI: 0021-9606(20030315)118:11L.5071:SETF;1-S
Material Identity Number: J008-2003-012
U.S. Copyright Clearance Center Code: 0021-9606/2003/118(11)/5071(11)/$19.00
Language: English
Abstract: We demonstrate, theoretically and experimentally, that the irradiation of a powder sample containing spin-1 nuclei by two of the three characteristic nuclear quadrupole resonance (NQR) frequencies can result in several echo signals at the third NQR frequency. One of these echoes, the principal echo, has the same shape and time of occurrence as an echo produced after a pair of single-frequency excitations. The other echoes are not equivalent to any single-frequency echo. These secondary echoes are the focus of this paper. The time of occurrence and shape of the secondary

echoes are determined by the correlation of the distribution in one transition frequency to the distribution in a second transition frequency. This correlation is in turn determined by the correlation between the distributions of the electric field gradient components, which is itself determined by the types and concentrations of crystalline defects present. We present the optimal conditions to observe such secondary echoes and compare theory with experiment using /sup 14/N (I=1) in powder samples of sodium nitrite and RDX.
Subfile: A

5/3,AB/3 (Item 3 from file: 2)
DIALOG(R)File 2:INSPEC

7029979 INSPEC Abstract Number: A2001-20-3325-001
Title: Three-frequency nuclear quadrupole resonance of spin-1 nuclei
Author(s): Sauer, K.L.; **Suits, B.H.**; **Garroway, A.N.**; Miller, J.B.
Author Affiliation: Naval Res. Lab., Washington, DC, USA
Journal: Chemical Physics Letters vol.342, no.3-4 p.362-8
Publisher: Elsevier,
Publication Date: 13 July 2001 Country of Publication: Netherlands
CODEN: CHPLBC ISSN: 0009-2614
SICI: 0009-2614(20010713)342:3/4L.362:TFNQ;1-N
Material Identity Number: C027-2001-031
U.S. Copyright Clearance Center Code: 0009-2614/2001/$20.00
Language: English
Abstract: We introduce a new nuclear quadrupole resonance (NQR) method for the detection of spin-1 nuclei, where the transition excited and directly detected is not irradiated at all. It is demonstrated, theoretically and experimentally, that the irradiation of a powder sample containing spin-1 nuclei by two of the three characteristic NQR frequencies can result in free induction decay (FID) and echo signals at the third NQR frequency. We present the optimal conditions for such three-frequency NQR experiments and compare theory with experiment using /sup 14/N (I=1) in a powder sample of sodium nitrite.
Subfile: A

5/3,AB/4 (Item 4 from file: 2)
DIALOG(R)File 2:INSPEC

6199119 INSPEC Abstract Number: A1999-09-0758-004
Title: Surface and gradiometer coils near a conducting body: the lift-off effect
Author(s): **Suits, B.H.**; **Garroway, A.N.**; Miller, J.B.
Author Affiliation: Dept. of Phys., Michigan Technol. Univ., Houghton, MI, USA
Journal: Journal of Magnetic Resonance vol.135, no.2 p.373-9
Publisher: Academic Press,
Publication Date: Dec. 1998 Country of Publication: USA
CODEN: JOMRA4 ISSN: 1090-7807
SICI: 1090-7807(199812)135:2L.373:SGCN;1-Q
Material Identity Number: J153-1999-001
U.S. Copyright Clearance Center Code: 1090-7807/98/$25.00
Language: English

Abstract: The use of surface coils in **magnetic resonance** is widespread. Examples include **MRI**, detection of subsurface aquifers by **NMR** , and, more recently, landmine detection by nuclear quadrupole resonance. In many of these cases a finite-sized sample to be examined is contained within a larger medium that is a poor electrical conductor, and eddy currents induced by the RF fields provide a loss mechanism that reduces the effective quality factor Q of the transmitter and receiver coils. Here the losses induced in a circular surface coil (a horizontal loop antenna) separated a distance from a dissipative medium are calculated and compared to measurements. It is shown that often the overall efficiency of the coil for **magnetic resonance** can be improved by displacing the coil away from the conducting medium a prescribed "lift-off" distance. The use of a gradiometer as a surface coil is also examined, and it is shown by theory and experiment that in certain circumstances such a gradiometer can be more efficient than a conventional surface coil for inspection of conducting media.

Subfile: A

5/3,AB/5 (Item 5 from file: 2)

DIALOG(R)File 2:INSPEC

5969576 INSPEC Abstract Number: A9816-0758-013

Title: Super-Q detection of transient **magnetic resonance** signals

Author(s): **Suits, B.H.**; **Garroway, A.N.**; Miller, J.B.

Author Affiliation: Div. of Chem., Naval Res. Lab., Washington, DC, USA

Journal: Journal of Magnetic Resonance vol.132, no.1 p.54-64

Publisher: Academic Press,

Publication Date: May 1998 Country of Publication: USA

CODEN: JOMRA4 ISSN: 1090-7807

SICI: 1090-7807(199805)132:1L.54:SDTM;1-4

Material Identity Number: J153-98006

U.S. Copyright Clearance Center Code: 1090-7807/98/$25.00

Language: English

Abstract: The signal-to-noise ratio (SNR) improvements with increasing detection coil quality factor, Q, are examined for the detection of known **magnetic resonance** signals in noise. It is found that in the absence of amplifier noise, SNR continues to increase with increasing Q even in the "super-Q" limit, when the bandwidth of the tuned detection circuit is smaller than that of the signal to be detected. In the super-Q limit, the maximum obtainable SNR is thus limited by noise from the amplifiers in the system. This contrasts with typical **NMR** measurements where the ultimate SNR is limited by thermal noise from the detection circuit. Explicit expressions are derived and are compared to experiments performed using electronically simulated spin echo signals.

Subfile: A

5/3,AB/6 (Item 6 from file: 2)

DIALOG(R)File 2:INSPEC

5963400 INSPEC Abstract Number: A9816-0758-005

Title: Noise-immune coil for unshielded **magnetic resonance** measurements

Author(s): **Suits, B.H.**; **Garroway, A.N.**; Miller, J.B.

Author Affiliation: Dept. of Phys., Michigan Technol. Univ., Houghton, MI, USA
Journal: Journal of Magnetic Resonance vol.131, no.1 p.154-8
Publisher: Academic Press,
Publication Date: March 1998 Country of Publication: USA
CODEN: JOMRA4 ISSN: 1090-7807
SICI: 1090-7807(199803)131:1L.154:NICU;1-7
Material Identity Number: J153-98004
U.S. Copyright Clearance Center Code: 1090-7807/98/$25.00
Language: English
Abstract: A modified split-loop resonator that is electrically balanced and that has no magnetic dipole moment is shown to be relatively immune to environmental noise. Using a **magnetic resonance** surface coil of this design for /sup 14/N NQR at 3.4 MHz, it is demonstrated that **magnetic resonance** measurements can be made in the laboratory without additional RF shielding and with less than a 2 dB increase in the RMS noise. Compared to more traditional designs, the modified split-loop resonator showed a net 17-dB gain in sensitivity for unshielded measurements.
Subfile: A

5/3,AB/7 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

06581361
E.I. No: EIP03437692475
Title: Optimizing surface coils and the self-shielded gradiometer
Author: **Suits, B.H.; Garroway, A.N.**
Corporate Source: Physics Department Michigan Technological University, Houghton, MI 49931-1295, United States
Source: Journal of Applied Physics v 94 n 6 Sep 15 2003. p 4170-4178
Publication Year: 2003
CODEN: JAPIAU ISSN: 0021-8979
Language: English
Abstract: A computational method for optimizing both single- and two-layer surface coils is presented. The method is easy to implement in practice using either a variational approach or through standard numerical matrix diagonalization techniques. Results of the optimization procedure are evaluated using measurements on prototype coils for a number of configurations and the finite-element numerical techniques. The results show that it is possible to construct practical coils that approximate the theoretically optimized coils quite well. (Edited abstract) 21 Refs.

5/3,AB/8 (Item 2 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05872684
E.I. No: EIP01336615535
Title: Remote sensing by nuclear quadrupole resonance
Author: **Garroway, A.N.**; Buess, M.L.; Miller, J.B.; **Suits, B.H.**; Hibbs, A.D.; Barrall, G.A.; Matthews, R.; Burnett, L.J.
Corporate Source: Naval Research Laboratory, Washington, DC 20375-5342, United States
Source: IEEE Transactions on Geoscience and Remote Sensing v 39 n 6 June 2001. p 1108

Publication Year: 2001
CODEN: IGRSD2 ISSN: 0196-2892
Language: English
Abstract: Detection of explosives has the flavor of those mathematical problems that are not invertible. It is easier to hide explosives than to find them. Many approaches have been proposed and executed for the remote detection of explosives, contraband materials, weapons of mass destruction, currency, etc. Most detection technologies suffer from a common problem: the features they look for, such as discontinuties in electrical conductivity, are not unique properties of the target but are contained, to some degree, in the more benign surroundings. Such a degeneracy leads to "clutter" in the response. For example, resolving the false alarms generated by this clutter can determine the rate of advance of a conventional electromagnetic metal detector employed as a landmine detector. One approach that provides a "unique" signature is nuclear quadrupole resonance (NQR) (the technique is also called QR, to avoid confusion with strictly nuclear techniques). This paper outlines the important physical principles behind the use of NQR for remote detection, indicates areas of applicability, and presents recent results of field trials of a prototype landmine detection system. 44 Refs.

8/3,AB/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

7734082 INSPEC Abstract Number: B2003-10-7310L-008
Title: Optimizing surface coils and the self-shielded gradiometer
Author(s): **Suits, B.H.; Garroway, A.N.**
Author Affiliation: Phys. Dept., Michigan Technol. Univ., Houghton, MI, USA
Journal: Journal of Applied Physics vol.94, no.6 p.4170-8
Publisher: AIP,
Publication Date: 15 Sept. 2003 Country of Publication: USA
CODEN: JAPIAU ISSN: 0021-8979
SICI: 0021-8979(20030915)94:6L.4170:OSCS;1-A
Material Identity Number: J004-2003-019
U.S. Copyright Clearance Center Code: 0021-8979/2003/94(6)/4170(9)/$20.00
Language: English
Abstract: A computational method for optimizing both single- and two-layer surface coils is presented that is relatively easy to implement in practice using either a variational approach or through standard numerical matrix diagonalization techniques. The technique is applied, in particular, to develop a self-shielded gradiometer that is relatively immune to radiofrequency (rf) interference from distant sources with a minimal compromise to its ability to sense rf from nearby sources, properties necessary for **nuclear quadrupole resonance** detection of buried land mines. Results of the optimization procedure are evaluated using finite-element numerical techniques and measurements on prototype coils for a number of configurations. These results show that practical coils can be constructed that approximate the theoretically optimized coils quite well. In addition, the trade off between the surface coil sensitivity and noise immunity is presented for the self-shielded gradiometer configuration.
Subfile: B

8/3,AB/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

7065831 INSPEC Abstract Number: A2001-22-7660G-002
Title: Circularly polarized RF magnetic fields for spin-1 **NQR**
Author(s): Miller, J.B.; **Suits, B.H.; Garroway, A.N.**
Author Affiliation: Div. of Chem., Naval Res. Lab., Washington, DC, USA
Journal: Journal of Magnetic Resonance vol.151, no.2 p.228-34
Publisher: Academic Press,
Publication Date: Aug. 2001 Country of Publication: USA
CODEN: JOMRA4 ISSN: 1090-7807
SICI: 1090-7807(200108)151:2L.228:CPMF;1-Y
Material Identity Number: J153-2001-008
U.S. Copyright Clearance Center Code: 1090-7807/2001/$35.00
Language: English
Abstract: The low sensitivity of **nuclear quadrupole resonance** (**NQR**) of powders is due, in part, to the inability to efficiently excite and detect nuclei at all crystal orientations. We describe the use of circularly polarized RF magnetic fields for excitation followed by detection of the resultant circular RF magnetization in I=1 **NQR** to increase the fraction of nuclei excited and detected. We show that the technique can greatly improve the effective RF field homogeneity and increase the largest signal amplitude by a factor of 1.72. In favorable

cases, the resulting circularly polarized **NQR** signal can be separated from linearly polarized magnetoacoustic and piezoelectric ringing artifacts that occur in some **NQR** materials detection applications.
Subfile: A

8/3,AB/3 (Item 3 from file: 2)
DIALOG(R)File 2:INSPEC

6974083 INSPEC Abstract Number: B2001-08-7730-007
Title: Remote sensing by **nuclear quadrupole resonance**
Author(s): **Garroway**, **A.N.**; Buess, M.L.; Miller, J.B.; **Suits**, **B.H.**; Hibbs, A.D.; Barrall, G.A.; Matthews, R.; Burnett, L.J.
Author Affiliation: Naval Res. Lab., Washington, DC, USA
Journal: IEEE Transactions on Geoscience and Remote Sensing vol.39, no.6 p.1108-18
Publisher: IEEE,
Publication Date: June 2001 Country of Publication: USA
CODEN: IGRSD2 ISSN: 0196-2892
SICI: 0196-2892(200106)39:6L.1108:RSNQ;1-Z
Material Identity Number: I341-2001-006
U.S. Copyright Clearance Center Code: 0196-2892/2001/$10.00
Language: English
Abstract: Detection of explosives has the flavor of those mathematical problems that are not invertible. It is easier to hide explosives than to find them. Many approaches have been proposed and executed for the remote detection of explosives, contraband materials, weapons of mass destruction, currency, etc. Most detection technologies suffer from a common problem: the features they look for, such as discontinuities in electrical conductivity, are not unique properties of the target but are contained, to some degree, in the more benign surroundings. Such a degeneracy leads to "clutter" in the response. For example, resolving the false alarms generated by this clutter can determine the rate of advance of a conventional electromagnetic metal detector employed as a landmine detector. One approach that provides a "unique" signature is **nuclear quadrupole resonance** (**NQR**) (the technique is also called QR, to avoid confusion with strictly nuclear techniques). This paper outlines the important physical principles behind the use of **NQR** for remote detection, indicates areas of applicability, and presents results of field trials of a prototype landmine detection system.
Subfile: B

8/3,AB/4 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015582624
WPI Acc No: 2003-644781/200361
XRAM Acc No: C03-176191
XRPX Acc No: N03-512914
Specimen examining apparatus, e.g. for explosives with quadrupolar nuclei, radiates different radio frequency pulses to specimen along X-axis and Y-axis, and receives signal from specimen along Z-axis
Patent Assignee: QUANTUM MAGNETICS INC (QUAN-N); US SEC OF NAVY (USNA); GARROWAY A N (GARR-I); HUO S (HUOS-I); LEE Y K (LEEY-I); MILLER J B (MILL-I); SAUER K L (SAUE-I); SUITS B H (SUIT-I); US SECRETAR (USDA)

Inventor: **GARROWAY A N**; HUO S; LEE Y K; MILLER J B; SAUER K L;
SUITS B; SUITS B H
Number of Countries: 095 Number of Patents: 003
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20030071619	A1	20030417	US 2001301821	P	20010702	200361	B
			US 2002183351	A	20020628		
WO 200376952	A2	20030918	WO 2002US20513	A	20020628	200362	
AU 2002367581	A1	20030922	AU 2002367581	A	20020628	200431	

Priority Applications (No Type Date): US 2001301821 P 20010702; US 2002183351 A 20020628
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20030071619	A1		18	G01V-003/00	Provisional application US 2001301821
WO 200376952	A2	E		G01R-000/00	

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZM ZW

AU 2002367581 A1 G01V-003/00 Based on patent WO 200376952

Abstract (Basic): US 20030071619 A1
Abstract (Basic):

NOVELTY - The apparatus radiate different radio frequency pulses to a specimen along X-axis and Y-axis, respectively. A signal is received from the specimen along a distinct Z-axis in response to irradiation. The radio frequency pulses and the signal are defined by the nuclear quadruple resonance frequencies of the nucleus of specimen.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method for detecting a class of target species containing nuclear quadrupolar nuclei.

USE - For detecting target species containing sub-kilogram quantities of narcotics and explosives having quadrupolar nuclei using **nuclear quadrupole resonance** (**NQR**) technique.

ADVANTAGE - Eliminates interfering signals from resonance acoustic ringing of certain metals at the irradiation frequency. Increases the signal-to-noise ratio per unit time, thus improving the detection precision of specimen having quadrupolar nuclei.

DESCRIPTION OF DRAWING(S) - The figures show the block diagram and schematic view of the above **NQR** system.

pp; 18 DwgNo 2, 3/10

8/3,AB/5 (Item 2 from file: 350)
DIALOG(R)File 350:Derwent WPIX

012347858
WPI Acc No: 1999-153965/199913
XRPX Acc No: N99-110931
Nuclear quadrupole resonance method for detecting target material
Patent Assignee: US SEC OF NAVY (USNA); GARROWAY A N (GARR-I); MILLER J B (MILL-I); SUITS B (SUIT-I)
Inventor: **GARROWAY A N**; MILLER J B; **SUITS B**
Number of Countries: 024 Number of Patents: 004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9906854	A2	19990211	WO 98US16166	A	19980803	199913 B
AU 9887669	A	19990222	AU 9887669	A	19980803	199927
US 20020093335	A1	20020718	US 97904937	A	19970801	200254
US 6522135	B2	20030218	US 97904937	A	19970801	200317

Priority Applications (No Type Date): US 97904937 A 19970801

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9906854	A2	E	40	G01V-000/00	
	Designated States (National): AU CA JP KR MX				
	Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE				
AU 9887669	A			G01V-000/00	Based on patent WO 9906854
US 20020093335	A1			G01V-003/00	
US 6522135	B2			G01V-003/00	

Abstract (Basic): WO 9906854 A2

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NOVELTY - The method involves emitting radio frequency (RF) fields in at least two, preferably three, non-parallel directions towards a sample, by passing (VII) the sample, via open end faces (404,406), through a single coil capable of generating RF fields in three orthogonal directions (X,Y,Z).

DETAILED DESCRIPTION - The RF fields emitted in first and second directions induce first and second resonance signals in the sample that each include **nuclear quadrupole resonance** (**NQR**) and acoustic ringing comprising magnetostrictive and piezoelectric ringing. These resonance signals are analyzed to distinguish **NQR** from acoustic ringing, using the observation that acoustic ringing and **NQR** respond differently to an RF field.

An INDEPENDENT CLAIM is included for a probe coil for emitting RF fields in three orthogonal directions to detect **NQR** in a sample.

USE - For detecting the presence of target materials such as explosives and illegal drugs against a background of more benign materials.

ADVANTAGE - Provides accurate detection of **NQR** while reducing the likelihood of false alarms. Separates **NQR** from acoustic ringing induced in a sample.

DESCRIPTION OF DRAWING(S) - The drawing illustrates a type of birdcage coil capable of generating RF fields in three orthogonal directions according to the present invention.

Four electrically conducting surfaces arranged, alternately, as opposite, parallel faces of a cuboid (400a,b,c,d)

Open end faces to allow passage of sample into coil (404,406)

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